



# Managing Neuromusculoskeletal (NMSK) Effects of Menopause

*This resource provides guidance to Service women on how to navigate the neuromusculoskeletal (NMSK) effects of menopause in a safe and effective manner to maintain readiness.*

## What is Menopause?

**Menopause** is the point in time 12 months after a woman's last menstrual cycle. The years leading up to that point are called menopausal transition or **perimenopause**.

*Menopause can present unique challenges for Service women on active duty.*

## NMSK IMPLICATIONS OF MENOPAUSE

- **Age-related changes** can impact a Service women's neurological, muscular, and skeletal function and create challenges in maintaining peak physical fitness.
- These changes may make it more difficult for service members to meet body composition standards later in life. The symptoms of menopause (see below) may exacerbate these challenges.
- During menopause, you may **lose muscle and gain fat** or notice more weight around the waist area and thinner skin.
- **Hormonal changes** throughout perimenopause and menopause contribute to weight gain. Specifically, the body seeks to store as much estrogen as possible which can result in fat gain, especially in the abdominal area.

» The most dangerous body composition change is the **decrease in bone density** due to decreased estrogen and progesterone production. The following pages will provide insights on managing decreased bone density to protect health and readiness.

## COMMON SYMPTOMS OF MENOPAUSE

- Change in your period
- Hot flashes
- Decreased bladder control
- Difficulty sleeping
- Vaginal dryness and discomfort or pain with sexual intercourse
- Mood changes
- Body composition changes

**Understanding the NMSK implications of menopause is crucial for Service women, especially those in their upper 30s to 40s.**

**By being proactive, you can better manage these changes and maintain your physical fitness and overall health.**

The following pages will provide more information on ways to maintain health and strength.

## OSTEOPOROSIS

Bones are made of living tissue. The healthy human body breaks down old bone tissue and replaces it with new bone to keep the skeleton strong. Estrogen is vital to this process. **Osteoporosis** occurs when more bone is broken down than replaced, especially influenced by a decline in estrogen levels during menopause. At the time of menopause, women may lose bone mass quickly for several years. After that, the loss slows down but continues.

- The average loss is 2% per year resulting in an average 10-12% total decrease in bone mineral density in the spine and hip.<sup>1</sup>
- In severe cases, simple motions such as minor bumps or a cough can cause a broken bone. People with osteoporosis also have a harder time recovering from broken bones.

## Osteoporosis affects 1 in 5 women over age 50.<sup>2</sup> Other risk factors include:

- + Surgical removal of ovaries prior to menopause
- + Long term corticosteroids, proton pump inhibitors, and antiepileptic medications
- + Poor dietary habits (insufficient calcium, vitamin D, or protein)
- + Low body mass index (underweight)
- + Physical inactivity
- + Having risk factors for cardiovascular disease (CVD)
- + Smoking
- + Heavy alcohol use



### Effect of Estrogen



*Estrogen has a protective effect on the cardiovascular system. Estrogen helps increase the elasticity of blood vessel walls which reduces plaque build-up. It also keeps cholesterol and other lipid profiles in healthy ranges. Decreased estrogen levels during menopause can lead to coronary artery disease and heart attack due to a loss of these protective effects.*

## Supporting Bone Health



- Healthy lifestyle choices (vitamin D, calcium supplementation and physical activity) can help treat osteoporosis; however, this may not be enough if you have lost a lot of bone density. You should consult your doctor about medications to consider, as some can slow bone loss, while others help rebuild bone. Maintaining and building strong bones is important for Service women before they even reach menopause. Research has shown that Service women, such as those in their mid-20s to 40s, can enhance their bone strength through training and adequate vitamin D intake.<sup>3,4</sup>

## Preventing Broken Bones



- Since osteoporotic bones are more brittle, they are prone to fracture with minimal force. A large force, such as a fall, often causes a fracture in osteoporotic bones. Taking steps to avoid falls will decrease your risk of a fracture.
- Balance training and performing simple exercises like standing on one leg for a period of time, lunges, heel raises, toe taps, and hopping can help improve your balance. See a physical therapist for a tailored program for your needs.
- Be cautious while walking during inclement weather.

<sup>1</sup> Osteoporosis. In: Musculoskeletal and Connective Tissue Disorders. MSD Manual Professional

Edition. [https://www.msdmanuals.com/professional/musculoskeletal-and-connective-tissue-disorders/osteoporosis/osteoporosis#Pathophysiology\\_v906751](https://www.msdmanuals.com/professional/musculoskeletal-and-connective-tissue-disorders/osteoporosis/osteoporosis#Pathophysiology_v906751).

<sup>2</sup> National Institute on Aging. Osteoporosis. <https://www.nia.nih.gov/health/osteoporosis/osteoporosis>.

<sup>3</sup> Lutz, L. J., Karl, J. P., Rood, J. C., Cable, S. J., Williams, K. W., Young, A. J., & McClung, J. P. (2012). Vitamin D status, dietary intake, and bone turnover in female Soldiers during military training: a longitudinal study. *Journal of the International Society of Sports Nutrition*, 9(1), 38. <https://doi.org/10.1186/1550-2783-9-38>

<sup>4</sup> Hughes, J., et al. (2018). Army Basic Combat Training Affects Bone Formation, Remodeling in Women. *Bone*, 116. [doi:10.1016/j.bone.2018.04.021](https://doi.org/10.1016/j.bone.2018.04.021)

# HOW TO MAINTAIN HEALTH AND STRENGTH DURING MENOPAUSE?

Below are ways to improve bone health.

## Bone Health

Lifestyle Changes	Suggestions
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**Regular Exercise & Weight Training** 

- **Regular physical activity** is a great way to prevent bone loss during ageing, including before/during/after menopause. Avoiding sedentary actions in your day-to-day (i.e., using standing desks) can further support bone health.
- Exercise programs that combine **high-impact activity with high-intensity resistance** training appear most effective in augmenting bone mineral density. High impact programs alone are not as effective as when combined with resistance training.
  - Highly bone-building exercises include basketball, volleyball, impact aerobics, dancing/gymnastics, tennis, jump rope.
  - Moderately bone-building activities include running/jogging, brisk or hill walking, resistance training, stair climbing, hiking.
  - Low bone-building activities include leisure walking, bocce or lawn bowls, yoga, Pilates, Tai Chi.
  - Non-bone-building activities include swimming and cycling.
- Recommend **moderate-high impact weight bearing physical activity or related impact loading sports for at least 30 minutes 3-5 days per week.**
  - Include **muscle strengthening exercises at least 2 days per week** at a high intensity (60-80% of 1RM), progressing challenge over time and targeting the major muscles around the hip and spine. (i.e., spinal extensors, hip extensors and abductors, knee flexors and extensors).
  - By adequately loading our skeletons through impact and weight training, we can stimulate cells in our bones to lay down new layers of stronger bone tissue. Overloading deficient bones without adequate rest can cause stress injuries. Weight training has also been shown to stimulate estrogen production which helps improve bone density.



**Calcium & Vitamin D Supplementation & Diet** 

- **Calcium – 1300-1500mg/day**
  - Calcium is a mineral that makes your bones stronger!
  - You can take a calcium supplement or consume it through normal food intake. Calcium-rich foods include dairy products, tofu, and dark leafy vegetables.
- **Vitamin D – 2000 IU/day**
  - Vitamin D is important for a lot of body functions, but *especially* for your bone health! Without enough vitamin D, your bones can't absorb the calcium to make them strong.
  - Exposure of both arms and legs to the sun for 5-30 minutes in the late morning/early afternoon without sunscreen can produce approximately 3,000 IU of vitamin D, however, if you are stationed north of Los Angeles, CA or Paris Island, SC you are not getting this benefit.
  - Sometimes it's hard to get out in the sun. You can get vitamin D from some foods (mostly fatty fish salmon, mackerel, sardines, egg yolks and fortified dairy products), but if you can't get 600 IU of vitamin D through your diet, it's recommended to take a vitamin D supplement of 2,000 IU/day.
- **Tobacco and alcohol both have a negative effect on bone density and should be avoided.**


# HOW TO MAINTAIN HEALTH AND STRENGTH DURING MENOPAUSE?

Below are ways to improve cardiovascular health and hot flashes.

## Cardiovascular Health

Lifestyle Changes	Suggestions
<p><b>Regular Exercise &amp; Weight Training</b></p> 	<ul style="list-style-type: none"> <li>Performing <b>regular cardiovascular exercise</b> will keep your cardiovascular system running at peak performance to maintain optimal health.                             <ul style="list-style-type: none"> <li>The American Heart Association (AHA) recommends adults get <b>150 minutes per week of moderate cardiovascular exercise or 75 minutes per week of vigorous cardiovascular exercise</b> in addition to <b>at least 2 days per week of strength training</b>, targeting each major muscle group (chest, back, legs, core, etc.).</li> </ul> </li> <li><b>Weight training</b> has been shown to stimulate estrogen production which decreases risk of cardiovascular disease.</li> </ul>
<p><b>Increasing Fiber Intake &amp; Eating a Heart-Healthy Diet</b></p> 	<ul style="list-style-type: none"> <li>Perimenopausal and menopausal women have shown to have an increase in cholesterol and the other blood lipids, creating a greater possibility of cardiovascular disease (CVD). This can be particularly mitigated with <b>increased fiber intake from whole foods and plant-based diets</b>, as the fiber binds up additional cholesterol and removes it in bowel movements.</li> <li>Eating a heart-healthy diet can help cardiovascular health.                             <ul style="list-style-type: none"> <li>The 2021 recommendation of the AHA encourages consumption of fruits and vegetables in fresh, frozen, canned and dried forms.</li> <li><b>Replacing refined grains with whole grains, higher intake of legumes and nuts, and consumption of 1-3 servings of fish per week</b> are all associated with decreased risk of CVD.</li> <li>Additionally, <b>liquid vegetable oils</b> (sunflower, olive, grape seed, linseed, soybean) <b>are recommended</b> instead of tropical oils (coconut, palm, and palm kernel), animal fats (butter and lard), and partially hydrogenated fats. Saturated and trans fats should be replaced with non-tropical liquid vegetable oils.</li> <li><b>Refined sugars (sweets and soft drinks) should also be limited or avoided.</b></li> </ul> </li> </ul>

## Hot Flashes

Lifestyle Changes	Suggestions
<p><b>Increasing Soy Intake &amp; Eating Plant-Based Meals</b></p> 	<ul style="list-style-type: none"> <li><b>Increased intake of soy</b> (phytoestrogens) in the diet has been shown to help decrease hot flashes.                             <ul style="list-style-type: none"> <li>There is conflicting literature on this treatment option as the isoflavone content of soy can have a positive effect on the strength and frequency of hot flash symptoms, but the intake of soy can have a negative effect on the treatment of breast tumors for patients looking to lower estrogen intake.</li> <li>One study recommended 80g/day of soy products (tofu, tempeh etc.) or 400mL/day of soy drinks for hot flash symptoms.</li> </ul> </li> <li>Higher meat and fat consumption has historically been associated with a higher frequency of hot flashes.</li> <li><b>Eating a greater amount of plant-based meals is shown to help lower the frequency and intensity of hot flashes.</b></li> <li><b>Limiting spicy foods, caffeine, and alcohol also has shown to decrease the frequency of hot flashes.</b></li> </ul>

## PELVIC FLOOR HEALTH

**Pelvic floor dysfunction during menopause is primarily caused by hormone changes**, as vaginal and lower urinary tract tissues are affected by the loss of estrogen during menopause. During menopause, pelvic floor symptoms from childbearing years, such as tightness, weakness, or pain, may resurface and worsen.

- Muscle loss during menopause can also lead to pelvic floor dysfunction.
- **Pelvic floor physical therapy (PFPT)** can help to treat symptoms of pelvic floor dysfunction that may be a result of menopause.
  - A pelvic floor physical therapist will evaluate your current pelvic floor health, muscle tone, and tightness and work on a customized program to address pelvic floor pain.
- For more information on PFPT and symptoms of pelvic floor dysfunction, please see [Navy Medicine's Women's Health Webpage](#) "Musculoskeletal" Tab.

### When to Seek Medical Attention:



If you are experiencing urinary incontinence, frequent constipation, pelvic organs bulging into your vagina, muscle tension or spasms in your pelvis, or pain during sex, you might be experiencing pelvic floor dysfunction and should seek care.

*For information on what defines the menopause and perimenopause period and common symptoms and treatments, please see [Navy Medicine's Guide for Service Women on Perimenopause and Menopause](#), found on the [Women's Health Webpage](#) under the "Perimenopause and Menopause" Tab.*

## ADDITIONAL RESOURCES

Topic	Links
Menopause	What is Menopause? ( <a href="#">Link</a> )
	Menopause and Hormone Replacement Therapy ( <a href="#">Link</a> , <a href="#">Link</a> )
	A Natural Approach to Menopause ( <a href="#">Link</a> )
Osteoporosis	National Institute on Aging ( <a href="#">Link</a> )
Bone Health	Menopause and Bone Health ( <a href="#">Link</a> )
Cardiovascular Health	Menopause and Cardiovascular Health ( <a href="#">Link</a> )
Hormones and Cancer	The Effects of Hormones in Dairy Milk on Cancer ( <a href="#">Link</a> , <a href="#">Link</a> )
	Estrogen in Animal Products ( <a href="#">Link</a> )

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